

## ASSOCIATING THE SOLAR WIND MEASURED BY ULYSSES WITH ITS SOURCE AT THE SUN

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Associating the solar wind measured by Ulysses with its source at the Sun is fundamental for understanding the origin and evolution of the solar wind, and for distinguishing solar wind structures that originate at the Sun from those generated in interplanetary space. Guided by recent results on the morphology of density and velocity in the corona from radio occultation, white-light, and ultraviolet measurements, we have compared the unprecedented Ulysses measurements of the fast wind with pB (polarized brightness) observations of path-integrated density made by the HAO (High Altitude Observatory) MLSO (Mauna Loa Solar Observatory) Mk III K-coronameter at 1.15  $R_{\odot}$ . Because of their increased sensitivity near the Sun, the pB measurements at 1.15  $R_{\odot}$  are able to detect the latitudinal and longitudinal variations not observed at higher altitudes in polar coronal holes, making it possible to compare white-light and Ulysses measurements quantitatively and systematically for the first time.

We show that the statistical characteristics (average, standard deviation, autocorrelation function) of pB in the corona are organized by solar latitude in the same way as those of density in the solar wind, suggesting that the fast wind observed by Ulysses maps approximately radially back to its source at the Sun. We have, therefore, mapped the individual daily measurements of Ulysses during its south polar passage in 1993–94 radially back to the Sun and compared them with the corresponding daily Mk III measurements. These show that the longitudinal structure of the solar corona does not survive to the distances of the Ulysses spacecraft, but that their consequences in the form of interaction regions are observed in the high latitude solar wind. The strongest interaction regions in the fast wind are produced when the fast wind from the south polar coronal hole (approximately 800 km/s) runs into the slower fast wind from the quiet Sun (approximately 700 km/s) ahead of it. We also show that the weaker high latitude interaction regions observed by Ulysses during its north polar passage in 1995–96 are a result of correspondingly smaller longitudinal variations in pB at the Sun during that time. Finally, we will discuss the implications of these comparisons for the upcoming polar passages of Ulysses during the high activity portion of the solar cycle.